

Appl. No. : 10/771,283
Filed : February 2, 2004

REMARKS

In response to the Office Action, Applicant respectfully requests the Examiner to reconsider U.S. Patent Application Serial No. 10/771,283, entitled "High Throughput Method and System for Screening Candidate Compounds for Activity Against Target Ion Channels" filed February 2, 2004 in view of the following comments.

I. Discussion of Claim Rejections Under 35 U.S.C. § 103

The Examiner has rejected Claims 1-2 and 4-7 under 35 U.S.C. § 103(a) as unpatentable over Tsien et al. (WO 96/41166) in view of Brust-Mascher et al. (Biophysical Journal, 1998, 75(4): 1669-1678).

The Examiner acknowledges that Tsien et al. fails to disclose the repetitive application of electric fields to cells in order to modulate the transmembrane potential of host cells. For a teaching of the repetitive application of electric fields in order to modulate the transmembrane potential, the Examiner relies on Brust-Mascher et al. However, Brust-Mascher et al. does not describe or suggest repetitive application of electric fields "so as to set a transmembrane potential to a level corresponding to a pre-selected voltage dependent state" as set forth in independent Claim 1.

In Brust-Mascher et al., a single electric field pulse is used to elicit a change in the transmembrane potential of a fish keratocyte cell membrane by way of calcium influx through calcium ion channels. However, rather than attempting to set the transmembrane potential to a pre-selected voltage dependent state, the reference only tries to characterize the transmembrane depolarization that results from a single electric field pulse to a cell membrane. Indeed, the reference states that the "[c]ells exhibited a variety of responses (Fig. 2). Some cells underwent a fast, sharp $[Ca^{2+}]_i$ wave; others underwent a slow $[Ca^{2+}]_i$ rise (Fig. 2 A)" (page 1671, last paragraph). The reference does not describe or suggest modulation of the resulting various depolarization states in any way so as to set the transmembrane potential to a pre-selected voltage dependent state of a target ion channel.

Additionally, the Brust-Mascher et al. reference does not describe or suggest using repetitive application of electric fields so as to modulate the transmembrane potential. The reference discloses the repeated application of electric field pulses to cells at intervals of 1-2 min

apart (page 1674, first column). At this slow rate, the transmembrane depolarization returns to a steady-state baseline. For example, time constants generally vary from 100 μ s to about one second (Application page 38). Thus, each electric field pulse used in Brust-Mascher would essentially have an effect on the cell membrane independent of the previous pulse. Indeed, this is reported by the reference when it notes that “[c]alcium concentrations dropped to values 30-50% above prefield values within a few seconds and returned to basal levels within a few minutes” (page 1673, last paragraph). The purpose of repeated pulses at intervals of 1-2 min apart in the reference was only to verify that repetition did not damage the cell or alter its ability to propulse itself towards a charged cathode (page 1674, first column). Thus, the repetitive application of electric fields in the reference was not so as to set a “transmembrane potential to a level corresponding to a pre-selected voltage dependent state of a target ion channel” as set forth in independent Claim 1.

The transmembrane potentials described by Brust-Mascher et al. are characterized by a wide variety of shapes and are produced in response to individual pulse stimuli. The reference does not describe or suggest modulating a transmembrane potential to a pre-selected voltage dependent state over the course of a series of applied electric fields. Brust-Mascher et al. cannot be construed as teaching the transmembrane potential changes claimed in independent Claim 1. It is this modulation of transmembrane potential over a series of pulses that makes the present invention much more useful in drug discovery than the induced potentials described in Brust-Mascher et al.

In light of the above, Applicant requests that the outstanding rejection of independent Claim 1 under 35 U.S.C. § 103(a) as unpatentable over Tsien et al. in view of Brust-Mascher et al. be reconsidered, and the claim be allowed. Applicant respectfully requests that the outstanding rejection of dependent Claims 2 and 4-7, being dependent on Claim 1, be reconsidered and the claims allowed for at least the same reasons.

The Examiner has rejected Claims 1-2 and 4-7 under 35 U.S.C. § 103(a) as unpatentable over Tsien et al. in view of Brust-Mascher et al., and further in view of Denyer et al. (Drug Discovery Today, 1998, 3(7):323-332).

The Examiner acknowledges that Tsien et al. fails to disclose the repetitive application of electric fields to cells in order to modulate the transmembrane potential of host cells.

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As discussed above, Applicant respectfully submits that Brust-Mascher et al. does not teach the modulation of transmembrane potential with repetitive application of electric fields so as to set said "transmembrane potential to a level corresponding to a pre-selected voltage dependent state" as set forth in Claim 1.

Denyer et al. also fails to disclose the repetitive application of electric fields to cells in order to modulate the transmembrane potential of host cells so as to set said transmembrane potential to a level corresponding to a pre-selected voltage dependent state. It cannot be construed as teaching the transmembrane potential changes claimed in independent Claim 1. It is this modulation of transmembrane potential over a series of pulses that makes the present invention much more useful in drug discovery than the induced potentials described in Denyer et al.

In light of the above, Applicant requests that the outstanding rejection of independent Claim 1 under 35 U.S.C. § 103(a) as unpatentable over Tsien et al., in view of Brust-Mascher et al., and further in view of Denyer et al. be reconsidered and the claim be allowed. Applicant respectfully requests that the outstanding rejection of Claims 2 and 4-7, being dependent on Claim 1, be reconsidered and the claims allowed for at least the same reasons.

The Examiner has rejected Claims 1-2 and 4-7 under 35 U.S.C. § 103(a) as unpatentable over Tsien et al. in view of Brust-Mascher et al., and further in view of Tung et al. (Biophysical Journal, 1992, 63(2):371-386).

The Examiner acknowledges that Tsien et al. fails to disclose the repetitive application of electric fields to cells in order to modulate the transmembrane potential of host cells.

As discussed above, Applicant respectfully submits that Brust-Mascher et al. does not teach the modulation of transmembrane potential with repetitive application of electric fields so as to set said "transmembrane potential to a level corresponding to a pre-selected voltage dependent state" as set forth in independent Claim 1.

Tung et al. fails to disclose the repetitive application of electric fields to cells in order to modulate the transmembrane potential of host cells so as to set said transmembrane potential to a level corresponding to a pre-selected voltage dependent state. It cannot be construed as teaching the transmembrane potential changes claimed in independent Claim 1. It is this modulation of

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transmembrane potential over a series of pulses that makes the present invention much more useful in drug discovery than the induced potentials described in Tung et al.

In light of the above, Applicant requests that the outstanding rejection of independent Claim 1 under 35 U.S.C. § 103(a) as unpatentable over Tsien et al. in view of Brust-Mascher et al., and further in view of Tung et al. be reconsidered and allowed. Applicant respectfully requests that the outstanding rejection of Claims 2 and 4-7, being dependent on Claim 1, be reconsidered and the claims allowed for at least the same reasons.

The Examiner has rejected Claims 1-2 and 4-7 under 35 U.S.C. § 103(a) as unpatentable over Gonzalez et al. (Drug Discovery Today, 1999, 4(9):431-439) in view of Tsien et al.

Applicant submits herewith a Declaration Under 37 C.F.R. § 1.132 by Jesus E. Gonzalez, to overcome the cited Gonzalez et al. reference as the reference is a publication of Applicant's own invention. Disclosure to the public of one's own work constitutes a bar to the grant of a patent claiming the subject matter so disclosed only when the disclosure occurred more than one year prior to the date of the application. 37 C.F.R. § 1.132; M.P.E.P §§ 715.01(A), 715.01(C), and 716.10; *In Re Katz*, 687 F.2d 450, 215 USPQ 14 (CCPA 1982); *In Re DeBaun*, 687 F.2d 459, 214 USPQ 933 (CCPA 1982) (an uncontradicted unequivocal statement from the applicant regarding the subject matter disclosed in a published application will be accepted as establishing inventorship). Additionally, disclaimers by the other authors in the publication are not required. *In Re Katz*. The Declaration includes an unequivocal statement from Jesus E. Gonzalez that he is the sole source of the subject matter cited by the Examiner in the Gonzalez et al. reference. As such, the Gonzalez et al. reference does not qualify as prior art under 35 U.S.C. § 102.

The publication date of the Gonzalez et al. reference is September 1999. The present application is a divisional of U.S. Patent Application 09/804,580 filed March 12, 2001 which application further claims priority under 35 U.S.C. § 119(e) to U.S. Provisional Application Serial No. 60/217,671, filed on July 10, 2000. Thus, the publication date of the Gonzalez et al. reference is less than one year prior to the effective filing date of the present application.

In light of the above, Applicant respectfully requests that Gonzalez et al. be removed from use as a reference and that the outstanding rejection of independent Claim 1 under 35 U.S.C. § 103(a) as unpatentable over Tsien et al. in view of Gonzalez et al. be reconsidered and the claim be allowed. Applicant respectfully submits that the outstanding rejection of Claims 2

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and 4-7, being dependent on Claim 1, is to be reconsidered and the claims allowed for at the same reasons.

The Examiner has rejected Claims 1-7 under 35 U.S.C. § 103(a) as unpatentable over Gonzalez et al. and Tsien et al. as applied to claims 1-2 and 4-7 above, and further in view of Tung et al. (Biophysical Journal, 1992, 63(2):371-386).

As discussed above, Applicant respectfully submits that Gonzalez et al. should be removed from use as a reference as the reference is a publication of Applicant's own invention.

The Examiner has previously acknowledged that Tsien et al. fails to disclose the repetitive application of electric fields to cells in order to modulate the transmembrane potential of host cells.

The Examiner acknowledges that Gonzalez and Tsien et al. fail to disclose the repetitive application of biphasic electric fields. For a teaching of the use of biphasic electric fields, the Examiner relies on Tung et al. However, the Tung et al. reference does not describe or suggest repetitive application of biphasic electric fields so as to set a "transmembrane potential to a level corresponding to a pre-selected voltage dependent state" as set forth in independent Claim 1.

In light of the above, Applicant requests that the outstanding rejection of independent Claim 1 under 35 U.S.C. § 103(a) as unpatentable over Gonzalez et al. and Tsien et al. as applied to Claims 1-2 and 4-7 above, and further in view of Tung et al. be reconsidered and the claim be allowed. Applicant respectfully submits that the outstanding rejection of Claims 2-7, being dependent on Claim 1, be reconsidered and the claims allowed for at the same reasons.

CONCLUSION

The Applicant has endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, amendments to the claims pursuant to the Examiner's rejections under § 103, the reasons therefore, and arguments in support of the patentability of the pending claim set are presented above. In light of these amendments and remarks, reconsideration and withdrawal of the outstanding rejections is respectfully requested.

Any claim amendments which are not specifically discussed in the above remarks are not made for patentability purposes, and it is respectfully submitted that the claims satisfy the statutory requirements for patentability without the entry of such amendments. These

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amendments have only been made to increase claim readability, to improve grammar, or to reduce the time and effort required of those in the art to clearly understand the scope of the claim language.

If the Examiner has any questions which may be answered by telephone, she is invited to call the undersigned directly. Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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